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THE
FORTY-SECOND ANNUAL REPORT
OF THE
BOARD OF DIRECTORS
OF THE
ZOOLOGICAL SOCIETY
OF PHILADELPHIA.

(INCORPORATED MARCH 21st, 1859.)

READ AT THE ANNUAL MEETING OF THE MEMBERS AND LOAN-
HOLDERS OF THE SOCIETY.

APRIL 23rd, 1914.

PHILADELPHIA:
PRESS OF ALLEN, LANE & SCOTT,
1211-1213 Clover Street.
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THE
ZOOLOGICAL SOCIETY OF PHILADELPHIA.
(FAIRMOUNT PARK.)

BOARD OF DIRECTORS:

ELECTED BY THE SOCIETY.

CHARLES B. PENROSE, M. D., <i>President.</i>	D. M. BARRINGER, WILLIAM D. WINSOR, NORTON DOWNS, M. D., W. B. CADWALADER, M. D., <i>Secretary.</i>
CHARLES M. LEA, SAMUEL G. DIXON, M. D., <i>Vice-President.</i>	ROBERT G. LE CONTE, M. D., HENRY PRATT MCKEAN, CLEMENT B. NEWBOLD, CHARLES S. W. PACKARD, <i>Treasurer.</i>
CHRISTIAN C. FEBIGER, <i>Vice-President.</i>	GEORGE L. HARRISON, JR., ALFRED GRATZ.
THOMAS BIDDLE, M. D., THOMAS DEWITT CUYLER, OWEN WISTER, CHARLES PLATT, JR.,	

ELECTED BY THE CITY COUNCILS.

SHELDON POTTER, JOHN P. CONNELLY.

SUPERINTENDENT OF THE GARDEN.

ROBERT D. CARSON.

PATHOLOGIST.

HERBERT FOX, M. D.

ASSISTANT PATHOLOGIST.

FREDERICK D. WEIDMAN, M. D.

SOLICITOR.

W. W. MONTGOMERY.

REPORT

OF THE

BOARD OF DIRECTORS.

PHILADELPHIA, April 23rd, 1914.

The Board of Directors of the Zoological Society of Philadelphia presents to the members and loanholders its forty-second annual report, for the year ending February 28th, 1914.

GENERAL AFFAIRS AND FINANCES.

The number of members at the close of the year was:—

Annual members.....	154
Life members.....	1,015
Honorary members.....	13
Perpetual memberships.....	246
Junior members.....	48
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Total members.. ..	1,476

The following is a report in detail of the admissions and receipts for the year:—

Adults (paying at gates).....	146,467
Children (paying at gates).....	44,091
Members (including life and annual members, loanholders' annual, and complimentary annual tickets)	1,324
Loanholders' single tickets.....	2,935
Free admissions (charitable institutions, donors' tickets, &c.)*.....	5,998
Coupon tickets.....	142
Excursion tickets.....	3,387
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	204,344

* In addition to these, 250,000 tickets were issued to the Board of Education, for the admission of pupils of the Public Schools.

*Monthly Record of Receipts from Admissions for 1913-1914
with corresponding account for 1912-1913.*

MONTH	1912-1913	1913-1914	COMPARISON
March.....	\$1,561 35	\$1,809 05	Increase.... \$274 70
April.....	2,268 85	1,672 25	Decrease.... 596 60
May.....	3,201 55	3,913 00	Increase.... 711 45
June.....	4,393 15	3,768 25	Decrease.... 624 90
July.....	3,813 10	4,263 20	Increase.... 450 10
August.....	5,565 20	5,913 95	" 348 75
September..	4,112 90	3,605 40	Decrease ... 507 50
October....	3,617 60	2,639 50	" 978 10
November..	1,685 35	1,795 85	Increase.... 110 50
December..	1,336 30	1,207 90	Decrease ... 128 40
January....	1,389 00	770 30	" 618 70
February...	1,206 85	830 55	" 376 30
	\$34,151 20	\$32,189 20	Decrease.. \$1,962 00

Owing to the unusual number of inclement Saturdays and Sundays the receipts from admissions were not equal to those of the preceding year, but, nevertheless, were much greater than those of any other year since 1907.

The important event of the year was the concession by the Commissioners of Fairmount Park of an additional tract of land for the use of the Society, for which the President and Directors desire here to express their appreciation.

When the Garden was opened it was bounded on the east by Thirty-fifth Street but, in 1891, this street was abandoned and Thirty-fourth Street Drive opened as one of the main entrances to the Park; since then, this land, between the abandoned street and the new drive, although graded and planted with trees by the Park Commission, has been of doubtful value as part of the City's playground. This tract, of some twelve acres, increases the area of the Garden to about fifty acres, which is believed to be fully as much as will ever be needed for its purposes.

The enclosure of this new land was undertaken at once; it necessitated the construction of over two thousand feet of concrete wall, eighteen inches above grade by two feet wide, and the removal to its new site of as much of the old iron fence, still in excellent condition after nearly forty years of service, as could be utilized on the new grade, and the construction and placing of nearly five hundred feet of new fence of similar design, as well as, on the west, along the line of Zoological avenue, recently placed on the city plan, of another five hundred feet of high wooden fence; much filling in of the new ground has also been done and while there remains much to do before it is ready for utilization the general appearance of the Garden, particularly from the Thirty-fourth Street Drive, has been greatly improved.

Among the minor improvements of the year, mention may be made of the construction of an outdoor chimpanzee cage; of twelve additional cages for monkeys and small mammals; of a large enclosure for pheasants, crowned pigeons &c.; an enclosure for brush turkeys and outdoor runs for the rhinoceros and hippopotamuses.

The galvanized iron work of the large skylights in the Monkey House conservatory was replaced with copper; the lighting in the Small Mammal House was much improved by five additional skylights and over 1500 square yards of asphalt walk was renewed.

A great improvement in the appearance of the western buffalo paddocks was effected by the substitution of electrically-welded wire fencing for the heavy wooden structure formerly used, and new interior iron chimneys were erected at each end of the Antelope and Elephant Houses, the old ones having become useless through corrosion after many years of use.

During the past winter the month of February was unusually cold. On several nights the temperature dropped to zero at the Garden; and on a number of days it did not get above 15°. There were kept out day and night, without any artificial heat, eighteen

monkeys. Eleven rhesus macaques and one pigtail macaque were together in a large cage. In individual cages there were two Barbary apes, a Grivet monkey, a yellow baboon, a Lion-tailed macaque, and a Hainan Gibbon—the two latter having also been out all of the previous year. In each cage there was a shelter box filled with hay, in which the monkey could retire. Two Cape hyraxes were also kept out all winter; one died the end of February, showing enteritis and congestion of the lungs. We consider it doubtful whether the cold caused this condition, which is not uncommon in Zoological Garden animals. The other hyrax is perfectly well.

Two *Cervinus* kangaroos stayed out, with access to an unheated building. These kangaroos were purchased last fall in Hamburg, where they had been kept out during the two preceding winters. Johanna, the Chimpanzee, was taken outside for one or two hours every day during the winter, except when it rained or snowed. The temperatures of the buildings were allowed to fall to a lower degree than on any previous winter. An example of the temperatures may be taken from an observation on February 12th. The lowest temperature during the night had been 1° above zero; at 2 P. M. it was 13° above zero; at that time the temperature of the Carnivora house was 25°, of the Elephant house, in which were elephants, rhinoceros and hippopotamuses, 38°, of the Giraffe house 39°, of the Monkey house 42°. The only warm houses were the Bird, Snake and small Mammal houses.

All the monkeys in the Monkey house had free access to the open air through swinging doors, and often went out voluntarily during the coldest days. Except for slight frost-bite of the end of the tail of two monkeys, none of the animals have appeared to suffer in any way from the cold, and all that were exposed are now apparently in good health, and in remarkably good coat.

Last spring an effort was made to obtain new members and, in response to a circular letter, eighty persons expressed their desire to be elected, of these, twenty-

nine became life members. While this is encouraging, as our membership is a large one, another effort will be made this year with, it is expected, still better results. It is hoped that our present members and all who receive this report will further this object either by proposing those who would be willing to associate themselves with the Society in this way or by submitting the names of such persons as they think might be interested. Reference to the members' lists, appended to this report, will show how large a proportion of the prominent people of this city and vicinity are now members of this Society, which is the oldest of the kind in the United States.

WILLIAMS B. CADWALADER,
Secretary.

TREASURER'S REPORT.

INCOME AND EXPENDITURES.

For the fiscal year ending February 28th, 1914.

INCOME.

Admission receipts.....	\$32,189 20
Rents at Garden.....	250 00
Interest.....	2,157 23
Sale of guides.....	148 50
Donkey rides.....	1,141 25
Sundry receipts.....	3,287 55
Received from the City of Philadelphia through the Commissioners of Fairmount Park.....	50,000 00
Total income.....	<u>\$89,173 73</u>

EXPENDITURES.

Salaries.....	\$23,041 71
Office expenses.....	1,005 49
General expenses.....	38,920 68
Purchase of animals.....	10,418 10
Animals contracted for.....	3,707 66
Repayment of loan.....	2,500 00
Permanent improvements.....	9,993 25
Total expenditures.....	<u>\$89,586 89</u>
Excess of expenditures over income.....	413 16
	<u>\$89,173 73</u>

C. S. W. PACKARD,
Treasurer.

Audited and found correct, March 31st, 1914.

STOCKTON BATES & SONS.

SUPERINTENDENT'S REPORT.

To the Board of Directors of the Zoological Society of Philadelphia:

GENTLEMEN:—I beg to submit my report for the year ending February 28th, 1914.

Total number of animals exhibited in each class during the year:—

MAMMALS.....	554
BIRDS.....	989
REPTILES.....	636
AMPHIBIANS.....	37
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	2,216

The accessions of species not previously exhibited in the collection were:—

White-crowned Monkey (*Cercopithecus petronellæ* Buttikofer).

Habitat, Upper Congo, Africa.

A fine specimen of this exceedingly rare animal was obtained by purchase on May 29th; this species was but recently described by Dr. J. Buttikofer of Rotterdam, who says of it that with the exception of the type specimen there were but two examples known.

Snow Leopard (*Felis uncia* Schreber).

Hab., high mountain ranges of Central Asia, above an elevation of 8000 feet.

A female of this beautiful species was received in fine condition on February 26th; a pair had been ordered, but the male, unfortunately, died before it was shipped. The specific name of this species is exceptionally apt as the characteristic spots on the back and sides in many specimens are suggestive of the uncial characters found in early medieval manuscripts.

Prairie Spotted Skunk (*Spilogale interrupta* Rafinesque).

Hab., Texas, Oklahoma and Kansas.

A pair of these small skunks was purchased on February 9th; these animals are good climbers, often taking refuge in trees when pursued, while the larger skunks of the closely-related genus *Mephitis* show no climbing propensities whatever.

Kamchatkan Brown Bear (*Ursus beringiana* Merriam).

Hab., Siberia.

A male and two females of this important species were received on September 27th; they were said to have been captured in the spring of 1911, when six months old, in northeastern Siberia. This is one of the largest of all the living bears, fully adult specimens attaining, it is said, a length of nine feet, thus rivaling in size the big brown bears of Alaska.

Wild Guinea Pig (*Cavia porcella* Linnæus).

Hab., Brazil.

A single specimen, one only of several pairs ordered, was received on May 10th.

Prjevalsky's Horse (*Equus prjevalskii* Poliakoff).

Hab., Western Mongolia.

On April 12th a fine two-year-old stallion of this interesting species was obtained by purchase; this is not only the sole known living species of truly wild horse but is believed to be the one from which the domestic horse of modern times is descended. The first of these animals to be exhibited in Europe were twenty-three colts, the survivors of over twice as many, captured by an expedition sent to the desert regions of western Mongolia in 1900 by Carl Hagenbeck, and it is these and their progeny that are now on exhibition in the principal zoological gardens and parks of Europe and the United States.

Mountain Zebra (*Equus zebra* Linnæus).

Hab., South Africa.

A pair purchased on June 24th; this species, being the first described and once plentiful, is still called the common zebra but has now become about the rarest of the existing species and its acquisition before it becomes extinct is a matter of congratulation.

Manchurian Sika Deer (*Cervus sika manchuricus* Swinhoe).

Hab., southwestern Manchuria.

A buck and two does from Vladivostok were purchased on June 21st; this is now considered a subspecies of the common sika or Japanese deer but is a much larger and handsomer animal and it would appear to deserve the specific rank originally assigned to it. Its relationship to the Japanese deer seems to be based on the sika or curved dagger-like character of its horns which is typical of fully-matured bucks of the former species.

Cervine Kangaroo (*Macropus cervinus* Thomas).

Hab., Western Australia.

A pair of this species which is seldom seen in collections was acquired by purchase on September 27th.

Crowned Jay (*Cyanocitta coronata* Swainson).

Hab., Mexico.

Aztec Jay (*C. stelleri azteca* Ridgway).

Hab., Mexico and Central America.

A male each of these species was purchased on December 23d.

Azure Jay (*Cyanocorax cæruleus* Vieillot).

Hab., Brazil.

This jay, much rarer than the preceding two, was purchased on November 11th.

Black-winged Mynah (*Graculipica melanoptera* Daudin).
Hab., Java and Madura.

A pair of these strikingly handsome and very rare white birds with black wings was purchased on April 10th, they are the first of the genus to be represented in the collection.

Mandarin Mynah (*Sturnia sinensis* Gmelin).
Hab., China and Malacca.

A single specimen was purchased on April 26th.

Bay-winged Cowbird (*Molothrus badius* Vieillot).
Hab., South America.

Two by purchase on August 29th.

Violet-eared Waxbill (*Granatina granatina* Linnæus).
Hab., South Africa.

A pair, male and female, of these lovely birds was purchased on January 10th; in exquisite beauty they rival the painted finches of Australia.

Indian Silverbill (*Aidemosyne malabarica* Linnæus).
Hab., India and Ceylon.

Two purchased on October 10th.

Chinese Thrush (*Trochalopteron canorum* Linnæus).
Hab., China.

One purchased April 30th.

Aztec Conure (*Conurus aztec* Sonance).
Hab., Mexico and Central America.

One purchased August 14th.

Meyer's Parrot (*Pæocephalus meyeri* Ruppell).
Hab., Equatorial Africa.

Two purchased July 24th.

Mississippi Kite (*Ictinia mississippiensis* Wilson).
Hab., southern United States to Brazil.

Four young specimens of this interesting species came by purchase from Alva, Oklahoma, on July 28th; as these birds are voracious feeders, subsisting largely, if not entirely, on insects, it was found

practically impossible to furnish them with a continuous supply of the only food they cared for and they all died of mycotic esophagitis before they attained the adult plumage.

Black Carrion Hawk (*Ibycter ater* Vieillot).

Hab., Amazon District of South America.

A single specimen presented on October 25th by Mr. Harry Nuding, of Para, Brazil. The genus *Ibycter* contains some eight or nine species which are distributed over the whole of South America; living specimens, outside of that country, at least, appear to be quite rare in collections.

Prince-of-Wales Pheasant (*Phasianus principalis* Sclater).

Hab., N. W. Afghanistan and N. E. Persia.

Mongolian Pheasant (*P. mongolicus* Brandt).

Hab., Central Asia.

A single male of each of these birds was purchased on April 8th and 30th, respectively.

Derbian Screamer (*Chauna derbiana* Gray).

Hab., Venezuela and Colombia.

A pair of these large and curious birds was purchased on June 20th and placed in the northern pheasant pen where they attracted much attention by their discordant screaming; although armed on each wing with a pair of sharp spurs they proved to be inoffensive and made no attempt to use them, either in defense or offense, when handled or in association with other birds in the same enclosure.

There were many other accessions during the year which, although previously represented, are of considerable importance and interest. Among these mention may be made of the following:—

BY PURCHASE; two pairs of Barbary apes, a pair of brown macaque monkeys, a pair of Canada lynx, a female condor and two pairs of South African ostriches;

all species which through government protection or threatened extermination are becoming increasingly difficult to obtain.

A cheetah or hunting leopard, a clouded leopard, a hyena dog and an African leopard; the latter, in contrast with the more common Indian type, has smaller spots and is much lighter in color and, representing an extreme variation, would be considered at least sub-specifically different were it not for the known intergradations shown in museum specimens.

A pair of wolverines, a Himalayan bear, a Burchell's zebra, a Bactrian camel, a pair of red kangaroos and a Malayan tapir. The acquisition of this Malayan or Saddle-backed tapir, which was a fully-adult male, enables us to exhibit, with the female previously on hand, what is seldom seen in any zoological collection, a fully-matured pair of these fine animals.

Mr. Albert J. White, of Fort Bayard, New Mexico, for the second time, presented us with a pair of wild cats. A female axis deer and two ruddy flamingos were presented by the New York Zoological Society and twelve black-crowned night herons by the National Zoological Park of Washington. Seventeen American magpies were donated by Mr. Howard Eaton, of Eatons' Ranch, Wolf, Wyoming; placed together in an outdoor cage these birds have proved to be a very satisfactory and attractive exhibit.

A collection of seventeen Brazilian specimens was received on October 25th as a gift from Mr. Harry Nuding, of Para, Brazil; these came in excellent condition and were a most acceptable addition to the collection; they consisted of three species of mammals, eight of birds, including a carrion hawk, never before represented in the collection, and four fine boa constrictors. Mr. Nuding is a member of the Society and this is the fourth shipment that he has presented to us. It is to be regretted that this kind of practical interest is not as general among our members as it is among those of

similar institutions abroad; the Zoological Society of London, in particular, is the recipient of many gifts from its foreign and traveling members and its collection, to a great extent, is kept up through such acquisitions.

The births during the year were as follows:—

- 1 rhesus macaque (*Macacus rhesus*), ♂, March 8th.
- 2 pig-tailed macaques (*M. nemestrinus*), ♂ and ♀, June 9th and April 5th.
- 1 Maholi galago (*Galago maholi*), August 29th.
- 3 Caffer cats (*Felis caffra*), ♂ and 2 ♀s, July 5th.
- 3 gray foxes (*Canis cinereo-argenteus*), May 10th.
- 2 raccoons (*Procyon lotor*), ♂s, July 10th.
- 3 grizzly bears (*Ursus horribilis*), January 8th.
- 2 California hair seals (*Zalophus californianus*), ♂ and ♀, June 9th and May 21st.
- 2 woodchucks (*Arctomys monax*), May 27th.
- 4 agoutis (*Dasyprocta* sp. ?), August 19th and January 27th.
- 1 Persian wild ass (*Equus onager*), ♀, May 1st.
- 2 American bison (*Bison bison*), ♂ and ♀, September 2d and August 30th.
- 2 Himalayan thar (*Hemitragus jemlaicus*), ♂ and ♀, June 13th and 14th.
- 1 aoudad (*Ovis tragelophus*), ♂, May 16th.
- 2 red deer (*Cervus elaphus*), 2 ♀s, May 26th and 31st.
- 2 American elk (*C. canadensis*), ♂ and ♀, August 7th and 10th.
- 1 fallow deer (*C. dama*), ♀, June 13th.
- 2 Japanese deer (*C. sika typicus*), ♂ and ♀, June 18th and August 2d.
- 1 Barasingha deer (*C. duvauceli*), ♀, June 28th.
- 3 white-tail deer (*Mazama virginiana*), ♀s, May 31st and July 17th.
- 1 llama (*Lama glama*), ♀, November 30th.
- 5 rat kangaroos (*Hypsignathus apicalis*), March, June, August and February.
- 2 silver pheasants (*Gennæus nycthemerus*), July 3d.

- 2 golden pheasants (*Chrysolophus pictus*), July 3d.
- 2 lesser black-backed gulls (*Larus fuscus*), June 4th.
- 3 herring gulls (*L. argentatus smithsonianus*), June 2d.
- 2 gulls, hybrid between lesser black-backed ♂ and herring ♀, July 3d.
- 3 gadwall ducks (*Chaulelasmus streperus*), July 10th.
- 6 red-headed ducks (*Fuligula ferina americana*), August 20th.
- 15 banded water snakes (*Tropidonotus sipedon fasciatus*), August 27th.
- 11 Fairie's garter snakes (*Thamnophis proxima*), August 25th.
- 19 red-skinned garter snakes (*T. sirtalis parietalis*), August 9th.
- 9 common garter snakes (*T. s. sirtalis*), August 4th.

There was a marked increase over last year in the value of the specimens exhibited; notwithstanding this, the death losses were less both proportionately and in actual value.

Of the mammals dying during the year the most important were: A mountain zebra, a Burchell's zebra, a clouded leopard, a cheetah and a Cape hunting dog; all of these were purchased during the year and, while in apparent good condition when received, were not in the collection long enough to assure that their death could not be attributed to conditions brought about by their capture and shipment before entering the collection. An unusually large and handsome male black bear, which was purchased in 1900, also died, although somewhat emaciated, his dead weight was 460 pounds.

The most important losses among the birds were: A condor, an emu and a Magellanic penguin and, among the reptiles, a blackish elephant tortoise and an Indian python.

Respectfully,

ROBERT D. CARSON,

Superintendent.

ZOOLOGICAL GARDEN, March 1st, 1914.

LIST OF ADDITIONS TO THE MENAGERIE DURING THE YEAR
ENDING FEBRUARY 28TH, 1914.

1913.

- March 4. 1 rat kangaroo born in the Garden.
8. 1 rhesus macaque (♂) born in the Garden.
2 pairs of silver pheasants purchased.
9. 2 yellow-throated parakeets presented by R. E. Scheirer, Philadelphia.
21. 2 long-tailed glossy starlings and 1 dial bird purchased.
22. 2 red kangaroos (♂ ♀) purchased.
25. 1 alligator presented by Charles Kirk, Philadelphia.
29. 1 pine snake presented by Charles H. Green, Hollyville, N. J.
30. 3 capybaras purchased.
31. 1 hog-nosed snake presented by H. C. Young, Philadelphia.
- April 3. 1 Swinhoe's pheasant (♂) and 1 Amherst pheasant (♂) purchased.
5. 1 pig-tailed macaque (♀) born in the Garden.
8. 1 Prince-of-Wales pheasant (♂) purchased.
10. 2 silver-eared liothrix, 2 yellow-bellied liothrix, 3 blue-cheeked barbets, 1 yellow-billed whistling thrush, 1 white-crested jay thrush, 2 black-headed mynahs, 2 goldfinches, 2 African silverbills, 2 cinereus waxbills, 1 European blackbird, 1 golden-naped amazon and 2 black-winged mynahs purchased.
6 rhesus monkeys (♀s), 4 wood pigeons and 1 occipital cassowary purchased.
11. 2 common crowned pigeons and 2 Victoria crowned pigeons purchased.
12. 1 striped hyena (♂) and 1 Prjevalsky's horse (♂) purchased.
16. 1 aoudad (♂) born in the Garden.
17. 2 eastern diamond rattlesnakes, 4 harlequin snakes, 3 black snakes, 3 common garter snakes, 5 Sacken's garter snakes, 1 American glass snake, 3 keeled green snakes, 6 hog-nosed snakes, 2 indigo snakes, 3 king snakes, 1 scarlet king snake, 3 whip snakes, 3 chicken snakes, 2 banded water snakes, 1 brown water snake, 10 wave-lined lizards, 1 fence lizard and 4 American green lizards purchased.
18. 6 ring-necked pheasants (♂s) purchased.
10 black-crowned night herons presented by the National Zoological Park, Washington, D. C.
22. 2 roseate spoonbills, 2 black snakes, 1 Muhlenberg's terrapin, 3 painted terrapins and 3 spotted terrapins purchased.
23. 1 weeper cebus (♀) presented by Frederick W. Heyl, Philadelphia.
26. 1 mandarin mynah, 2 yellow-bellied black snakes, 2 Fairie's garter snakes, 2 red-skinned garter snakes, 1 hog-nosed snake, 3 Say's pine snakes, 2 western sand snakes and 3 Holbrook's water snakes purchased.
30. 1 genet (♀), 2 chestnut-headed buntings, 1 Chinese thrush, 2 Senegal parrots, 1 Salle's amazon, 1 Mongolian pheasant, 1 Reeve's pheasant and 2 Indian rat snakes purchased.
1 Canada porcupine presented by C. K. Sober, Lewisburg, Pa.
1 European blackbird presented by Robert Schilling, New York.
- May 1. 1 Persian wild ass (♀) born in the garden.
2 green glossy starlings and 2 striped water snakes purchased.
1 blotched king snake exchanged.
4. 1 brown thrush presented by Arthur G. Horr, Philadelphia.
8. 2 emus purchased.
10. 1 hyena dog (♂), 1 acouchy, 1 wild Guinea pig, 1 boat-billed heron and 3 striped water snakes purchased.

- May 10. 3 gray foxes born in the Garden.
 11. 1 alligator presented by Miss Isabelle Mousley, Philadelphia.
 13. 1 sooty mangle (♂), 3 white-nosed coatis (♂ and 2 ♀s) and 12 undulated grass parakeets purchased.
 14. 1 Bactrian camel (♀) and 2 common iguanas purchased.
 15. 2 blue-fronted amazons presented by A. V. Kaiser, Philadelphia.
 16. 1 prairie rattlesnake, 5 copper-bellied black snakes, 3 elegant bull snakes, 2 Fairie's garter snakes, 1 red-skinned garter snake, 6 hog-nosed snakes, 1 Say's king snake, 1 LeConte's snake, 4 Say's pine snakes, 4 milk snakes, 5 western sand snakes, 4 Holbrook's water snakes and 1 glass snake purchased.
 17. 3 American beaver purchased.
 21. 1 California hair seal born in the Garden. 2 California hair seals, 2 Senegal parrots, 2 ring-necked parakeets and 1 Nepaul parakeet purchased.
 22. 1 Berlandier's tortoise purchased.
 23. 2 alligators presented by Miss Peggy Rosengarten, Philadelphia.
 26. 1 red deer (♀) born in the Garden. 2 brown water snakes, 2 corn snakes, 3 banded water snakes and 3 copper-bellied water snakes purchased and 3 black snakes, 1 whip snake and 1 brown water snake received in exchange.
 27. 2 woodchucks born in the Garden.
 29. 1 gopher tortoise purchased.
 30. 1 white-crowned monkey (♀), 2 Canada porcupines and 4 pairs of mallard ducks purchased.
 31. 1 cheetah (♂) purchased. 1 red deer (♀) and 1 common deer (♀) born in the Garden.
- June 1. 14 prairie dogs, 2 prairie rattlesnakes, 1 Say's king snake, 1 LeConte's snake, 3 whip snakes, 2 Graham's water snakes, 6 collared lizards and 6 common horned lizards purchased.
 2. 3 herring gulls born in the Garden.
 4. 2 black-backed gulls born in the Garden.
 5. 1 snapping terrapin presented by Victor Grillet, Philadelphia.
 6. 1 Bewick's swan purchased. 1 yellow-throated parakeet presented by Miss Dorothy Fisher, Philadelphia. 2 giant toads presented by William Beisel, Philadelphia.
 7. 1 Malayan tapir (♂) purchased. 1 American crow presented by Charles Kandler, Philadelphia. 1 blue and yellow macaw presented by Miss Mary Merrick Williams, Bala, Pa. 1 alligator presented by Miss Meribah C. Delaplaine, Merion, Pa. 2 water mocassins, 1 harlequin snake, 1 red-bellied snake and 7 cyclops water snakes purchased. 2 black snakes, 1 common garter snake, 1 pine snake and 2 banded water snakes presented by A. M. Nicholson, Orlando, Florida.
 8. 1 common water snake presented by D. D. March, Philadelphia.
 9. 1 pig-tailed macaque (♂) and 1 California hair seal born in the Garden. 1 common crow presented by John Regan, Philadelphia.
 10. 1 Muhlenberg's terrapin and 1 snapping terrapin presented by Victor Grillet, Manoa, Pa.
 11. 2 Barbary apes (♂ and ♀), 1 clouded leopard (♂), 1 binturong, 4 blood-breasted pigeons and 1 boa constrictor purchased. 1 bonnet macaque (♂) presented by Mrs. N. J. Fox, Philadelphia.
 11. 1 mountain black snake presented by C. A. Potterfield, Charleston, W. Va.

- June 12. 1 ruddy sheldrake (♀) purchased.
 13. 4 South African ostriches (2 ♂ and 2 ♀) purchased. 1 fallow deer (♀) and 1 thar (♂) born in the Garden.
 14. 1 thar (♀) born in the Garden.
 15. 3 Eskimo dogs born in the Garden.
 16. 1 Canada porcupine presented by Coleman K. Sober, Lewisburg, Pa. 1 giant toad presented by William Beisel, Philadelphia.
 17. 1 painted terrapin presented by Jos. Hienerwald, Philadelphia.
 18. 1 Japanese deer (♂) born in the Garden.
 19. 1 lesser sulphur-crested cockatoo presented by Mrs. P. J. Rose, Philadelphia. 2 barn owls presented by Mrs. J. Porter, Philadelphia.
 20. 2 Derbian screamers, 1 brown-fronted macaw, 1 Guatemalan amazon and 1 red-vented parrot purchased.
 21. 1 alligator presented by R. J. Doyle, Collingswood, N. J.
 23. 2 European glass snakes, 1 leopard snake, 4 common ringed snakes, 2 vivacious snakes, 1 dark-green snake and 1 eyed lizard purchased.
 24. 2 mountain zebra (♂ and ♀) and 1 Burchell's zebra (♂) purchased.
 26. 1 alligator presented by Will K. Bowen, Riverton, N. J.
 27. 1 huanaco (♂) born in the Garden.
 28. 1 barasinga deer (♀) born in the Garden.
 30. 1 wave-lined lizard and 2 mud turtles presented by Master Richard Schwoebel, Philadelphia.
- July 1. 1 raccoon (♂) presented by Mrs. Owen Wister, Philadelphia. 1 pine snake presented by Frank Stenner, Camden, N. J.
 2. 1 diamond-backed terrapin presented by Joseph R. Wainwright, Chestnut Hill, Pa.
 3. 2 golden pheasants, 2 silver pheasants and 2 hybrid gulls born in the Garden. 2 alligators presented by J. Clayton Reed, Ambler, Pa. 5 ringed snakes, 1 banded water snake and 3 slow worms presented by J. Hope, Philadelphia.
 4. 12 green lizards, 1 spotted salamander and 3 fire-bellied toads presented by J. Hope, Philadelphia.
 5. 3 Caffer cats born in the Garden.
 10. 2 raccoons and 3 gadwell ducks born in the Garden.
 12. 1 gray squirrel presented by W. Stokes Kirk, Philadelphia.
 13. 1 sparrow hawk presented by Miss Isabella C. Lewis, Philadelphia. 3 red salamanders presented by D. D. March, Philadelphia.
 16. 1 DeKay's snake and 1 giant toad presented by William Beisel, Philadelphia.
 17. 2 common deer (♀s) born in the Garden.
 18. 1 pine snake purchased.
 19. 1 golden-naped amazon presented by Mrs. Pinnekamp, Philadelphia.
 24. 1 spot-billed tpucanet (♂), 1 vulturine guinea-fowl and 2 Meyer's parrots purchased.
 26. 1 alligator presented by Mrs. P. A. Kearney, Philadelphia.
 27. 1 yellow-bellied liothrix presented by P. F. Harpel, Philadelphia.
 28. 2 Swainson's buzzards and 4 Mississippi kites purchased. 1 garter snake, 6 water snakes, 1 painted terrapin and 2 box tortoises presented by D. D. March, Philadelphia.
 31. 1 striated terrapin presented by Mrs. E. Ziegler, Philadelphia.
- Aug. 1. 1 axis deer (♀) presented by the New York Zoological Society. 1 striated terrapin presented by Mrs. William Kucher, Philadelphia.

- Aug. 2. 1 cardinal redbird presented by Master Charles Shingle, Germantown, Philadelphia.
3. 1 banded rattlesnake presented by C. A. Potterfield, Charleston, W. Va.
4. 2 alligators presented by Master William Norris Hires, Salem, N. J. 1 pine snake presented by David McCadden, Philadelphia. 9 common garter snakes born in the Garden.
6. 3 swift foxes purchased.
7. 2 alligators presented by Mrs. Charles Scully, Germantown, Philadelphia. 1 elk (♂) born in the Garden.
9. 1 rat kangaroo and 19 red-skinned garter snakes born in the Garden.
10. 1 elk (♀) born in the Garden.
12. 1 alligator presented by John C. Dessalet, Philadelphia.
14. 1 Aztec conure presented by Walter Thompson, Philadelphia. 1 rat kangaroo born in the Garden.
15. 1 Levaillant's amazon presented by C. Reed, Philadelphia.
16. 1 orange-winged amazon purchased.
17. 1 alligator presented by Theodore C. Taylor, Jenkintown, Pa.
19. 1 Canada porcupine purchased. 2 agoutis born in the Garden.
20. 6 red-headed ducks born in the Garden.
21. 1 alligator, 1 green snake and 1 ring-necked snake presented by Joseph Medicus, Jr., Philadelphia.
25. 11 Fairie's garter snakes born in the Garden.
27. 15 banded water snakes born in the Garden.
28. 1 barred owl presented by H. E. Bucher, Plainfield, N. J.
29. 2 bay-winged cowbirds purchased. 1 Maholi galago born in the Garden.
30. 1 American bison (♀) born in the Garden.
- Sept. 1. 2 wild cats (♂ and ♀) presented by Albert J. White, Fort Bayard, N. M.
1. 1 least bittern presented by William F. Kline, Philadelphia.
2. 1 American bison (♂) born in the Garden.
3. 2 nine-banded armadillos (♂ and ♀) purchased.
8. 1 undulated grass parakeet (♂) presented by Miss Margaret Stewardson, Abington, Pa.
9. 1 pine snake presented by Guy King, Philadelphia.
15. 1 hog-nosed snake presented by Arthur J. Casselman, M. D., Camden, N. J. 3 painted terrapin presented by Master Samuel T. Pike, Philadelphia.
17. 2 hog-nosed snakes presented by John Hipp, Paulsboro, N. J.
18. 1 vulturine guinea-fowl purchased.
20. 1 banded rattlesnake presented by C. A. Potterfield, Charleston, W. Va. 10 young diamond rattlesnakes presented by Harry W. Aitken, Philadelphia.
21. 1 alligator presented by Miss Dot White, Philadelphia.
22. 1 American crocodile presented by Master William Heidke, Philadelphia.
26. 1 blotched king snake exchanged. 1 prairie rattlesnake, 4 yellow-bellied black snakes, 1 Fairie's garter snake, 1 red-skinned garter snake, 3 hog-nosed snakes, 1 milk snake, 1 Say's pine snake, 3 whip snakes and 3 Holbrook's water snakes purchased.
27. 3 Kamchatkan brown bears (♂ ♀ ♀), 1 Himalayan bear (♂), 2 wolverines (♂ ♀), 2 coypus (♂ ♀), and 2 cervine kangaroos (♂ ♀) purchased. 1 great eagle owl deposited. 2 ruddy flamingoes presented by the New York Zoological Society.

- Sept. 28. 1 green-cheeked amazon presented by Charles J. Beale, Philadelphia.
29. 2 brown macaques (♂ ♀), 4 bishop weavers and 1 Salle's amazon purchased.
- Oct. 1. 1 water mocassin, 4 ground rattlesnakes, 3 black snakes, 4 chicken snakes, 1 Sacken's garter snake, 1 hog-nosed snake, 4 king snakes, 2 whip snakes and 1 scarlet king snake purchased.
2. 2 wandering lizards and 4 hermit crabs presented by Fred. A. Willits, Spring Lake, N. J.
4. 2 silver and 3 golden pheasants presented by Mr. and Mrs. J. Hampton Moore, Philadelphia.
5. 2 Texas mud turtles presented by Harry W. Aitken, Philadelphia.
6. 1 mountain black snake presented by C. A. Potterfield, Charleston, W. Va.
8. 2 black-handed spider monkeys purchased.
9. 1 alligator presented by Mrs. J. E. DeAngeli, Philadelphia. 1 alligator presented by Carl M. Clark, Philadelphia.
10. 2 jackdaws, 2 blackcap warblers, 2 Indian silverbills and 1 reticulated python purchased.
11. 1 Barbary turtle dove presented by William Moore, Jr., Philadelphia. 1 alligator presented by Dr. John D. Groves, Philadelphia.
14. 4 banded rattlesnakes purchased. 1 alligator presented by Master Charles Singer, Atlantic City, N. J. 2 European tree toads and 1 baby terrapin presented by Mrs. W. M. Blackburn, Philadelphia.
16. 1 Canada porcupine (♀) presented by H. B. Griffiths, Lancaster, Pa.
19. 1 blue-crowned hanging parrakeet (♀) presented by J. W. Marshall, Philadelphia.
20. 4 banded rattlesnakes purchased.
21. 2 Amherst pheasants (♀ ♀) presented by Dr. Norton Downs, Three Tuns, Pa.
22. 1 American green lizard presented by W. B. Duvall, Philadelphia. 1 mule deer (♀) purchased.
23. 2 crested pigeons, 2 fire-tailed finches, 2 European skylarks, 1 goldfinch, 1 chaffinch and 2 yellow-ammers purchased.
24. 1 American green lizard presented by John S. Clarke, Bryn Mawr, Pa.
25. 2 prairie rattlesnakes, 5 yellow-bellied black snakes, 1 elegant bull snake, 1 Marcy's garter snake, 3 red-skinned garter snakes, 4 hog-nosed snakes, 6 Say's pine snakes, 2 Western sand snakes, 2 Holbrook's water snakes and 1 whip snake purchased.
25. 1 weeper cebus (♂), 1 three-banded night monkey (♀), 1 ocelot (♂), 1 Cuvier's toucan, 1 black carrion-buzzard, 1 yellow-headed conure, 1 blue and yellow macaw, 3 scarlet ibis, 1 crested curassow (♂), 1 Yarrell's curassow (♀), 1 white-eye-browed guan and 4 boa constrictors presented by Harry Nuding, Para, Brazil.
29. 2 water mocassins, 3 black snakes, 6 chicken snakes, 4 garter snakes, 7 hog-nosed snakes, 4 king snakes, 1 pine snake, 4 whip snakes and 1 banded water snake purchased.
30. 2 black-headed coures purchased. 1 yellow-cheeked amazon presented by Mrs. J. H. Foster, Bustleton, Pa.
- Nov. 1. 1 leopard (♀) and 1 North African jackal (♀) purchased.
3. 1 green monkey (♀) presented by John J. McClure, Chester, Pa.
5. 1 indigo snake presented by Wesley L. Hall, Philadelphia.

- Nov. 7. 1 red-tailed hawk presented by H. B. Garey, Lovelton, Pa.
 8. 1 condor (♀) purchased. 1 king snake presented by Samuel Scoville, Jr., Philadelphia.
 11. 1 pileated jay, 1 azure jay, 1 red-winged thrush, 1 rosehill parakeet and 2 Pennant's parakeets purchased.
 13. 1 alligator presented by Miss S. S. Mertz, Philadelphia.
 14. 2 Western diamond rattlesnakes and 2 Say's pine snakes purchased.
 19. 1 alligator presented by Miss Paulina Williams, Philadelphia.
 22. 2 Barbary apes (♂ and ♀) and 1 mandarin mynah purchased.
 24. 1 red-tailed buzzard presented by E. K. Mahaun, Philadelphia.
 25. 1 wild turkey (♀) from egg laid in the Garden.
 26. 1 common opossum (♀) presented by Joseph Medicus, Jr., Philadelphia.
 29. 2 box tortoises presented by Master Thomas Wood, Philadelphia.
 30. 1 llama (♀) born in the Garden.
- Dec. 2. 1 screech owl presented by Harold K. Brown, Graver's Station, Pa.
 3. 1 western diamond rattlesnake presented by W. O. Learn, San Antonio, Texas.
 5. 2 bullfinches, 1 cutthroat finch, 2 European robins, 4 grenadier weavers and 2 great weavers purchased.
 6. 1 white-cheeked mangabey (♂), 1 green glossy starling, 2 European magpies, 2 quail finches and 1 Meyer's parrot purchased.
 13. 1 screech owl presented by Emil Pfeifer, Philadelphia.
 15. 1 barn owl presented by John Gillespie, Philadelphia.
 17. 1 copperhead snake, 1 king snake, 2 corn snakes and 2 hog-nosed snakes purchased.
 19. 1 screech owl presented by Mrs. John Eberly, Philadelphia.
 21. 1 screech owl presented by L. B. Hoffman, Philadelphia.
 22. 17 American magpies presented by Howard Eaton Wolf, Wyoming.
 23. 1 crowned jay purchased.
 29. 4 American badgers purchased.
- 1914.
- Jan. 7. 2 gray foxes (♂ and ♀) purchased. 1 American wild cat presented by Joseph Medicus, Jr., Philadelphia. 1 common deer (♀) presented by Mrs. Elizabeth Hall, Philadelphia.
 8. 3 grizzly bears born in the Garden.
 10. 1 alligator presented by James Stokley, Jr., Philadelphia.
 10. 1 goldfinch, 1 cutthroat finch, 1 grenadier weaver, 2 scaly-fronted finches, 2 violet-eared waxbills, 2 Bohemian waxwings and 2 bay-winged cowbirds purchased.
 12. 1 alligator presented by Mrs. George Carnack, Philadelphia.
 16. 1 alligator presented by Master Morris Fleishman, Jr., Philadelphia.
 17. 1 alligator presented by Miss Elizabeth Wainwright, Philadelphia.
 27. 2 agoutis born in the Garden.
- Feb. 1. 1 yellow-throated parakeet presented by P. F. Harpel, Philadelphia.
 4. 1 alligator presented by L. N. Taylor, Philadelphia.
 9. 2 prairie spotted skunks purchased.
 14. 1 toque macaque (♀) and 1 Malabar green bulbul purchased.
 19. 1 horned rattlesnake presented by Dr. H. L. Coffman, Palm Springs, Cal.
 20. 1 Tasmanian devil (♂) and 2 common crowned pigeons purchased.
 21. 1 rat kangaroo born in the Garden.
 23. 3 American badgers purchased.
 26. 1 snow leopard (♀) purchased.
 27. 2 Canada lynx purchased.

THE REPORT OF THE LABORATORY OF COMPARATIVE
PATHOLOGY FOR THE YEAR ENDING FEBRUARY 28,
1914.

The past year has been one of moderate activity in the laboratory as far as concerns autopsies upon animals dying in the collection. The total number dying, 293, is lower than in the previous three years. Investigations have been continued by Dr. Weidman and myself. Dr. Weidman proceeds with his observations upon the spiroptera of parrots and upon new species of worms found at this laboratory. He is also investigating one of the higher bacteria which was isolated from a transplantable tumor of a macaw.

I have been occupied in investigating the diseases of the thyroid gland in wild animals and read my observations at the Pathological Society in February of this year. In my studies it was shown that practically all the pathological conditions seen in the human thyroid in disease could be found also in wild animals, even those associated with exophthalmic goitre were found, but we can record no exophthalmos (during life) among wild animals. It has also been discovered that Primates (381 specimens), Rodentia (140) and Accipitres (109) showed no thyroid changes, while Carnivora (282) showed fourteen cases of thyroid disease. There was respectively one case among the Ungulata (197), Passeres (665), Galli (113) and Psittaci (457) while among the Marsupialia (78) there were two cases. These studies have unfortunately thrown no light upon the causation of goitre.

Further investigation is on foot to study the death of three kites which died from a mycotic esophagitis and to produce a test for tuberculosis in birds. At the suggestion of Dr. Penrose I am preparing a tuberculin from bird tubercle bacilli to be used for instillation into the conjunctiva. In a short time the diseases of the liver and kidney will be statistically and pathologically studied following the methods used in the thyroid gland work.

Dr. E. A. Schumann has been studying our records of dystocia and the pelves obtained from the fatal cases. From this material, some fetuses, female genitalia and pelves obtained at this laboratory he prepared a paper upon labor from a comparative standpoint and read it at the Philadelphia Obstetrical Society. Material has also been supplied by the laboratory to the following gentlemen: Dr. McClung, Dr. S. G. Dixon, Dr. E. C. Kirk and Dr. A. J. Smith.

In preparing this report I have departed from the method of former years of listing individual diagnoses and have substituted lists of diagnoses and animal orders. Experience, scientific books and journals have taught us what diagnoses to expect. It seems advisable now to group our data under animal and pathological headings that strictly comparable conditions may be studied. I may, at a later date, divide these statistics according to food, length of stay in the garden, seasonal distribution and possibly as to age and sex. The diagnoses in the tables are those of direct or collateral importance in the death of the animals. The incidental and unimportant diagnoses are omitted. In the second part of this report there will be discussed, as heretofore, the tuberculin test and important or interesting groups of cases.

The following is a list of animals dying during the foregoing year. The totals will be found not to tally with the records upon the table, as some specimens have died from injury, and some were decomposed. Moreover, in many instances animals are included in the figures of more than one heading, for lesions of importance may have been found in more than one of the anatomical systems. It is seldom the case that only one of the systems is affected sufficiently to be the only cause of death.

Total animals examined, 293.

Total *Mammalia*, 98.

Primates, 20; Lemures, 3; Carnivora, 31; Ungulata, 14; Rodentia, 22; Marsupialia, 4; Edentata, 2; Pinnipedia, 1; Hyraces, 1.

Total *Aves*, 192.

Passeres, 69; Picariæ, 5; Psittaci, 37; Striges, 6; Anseres, 16; Galli, 15
Columbæ, 17; Accipitres, 13; Herodiones, 7; Struthiones, 2; Fulicariæ, 2; Palamedeæ, 1; Impennes, 1; Odontoglossæ, 1.

Total *Reptilia*, 3.

Squamata, 2; Testudinata, 1.

Diseases of the gastro intestinal tract:

Stomatitis: Galli, 1; Struthiones, 2.

Esophagitis: Accipitres, 4; Galli, 1.

Proventriculitis: Psittaci, 2.

Gastritis: Primates, 2; Carnivora, 11; Rodentia, 4; Ungulata, 4; Marsupialia, 1; Picariæ, 1; Struthiones, 1; Accipitres, 2; Squamata, 2; Testudinata, 1.

Enteritis: Primates, 5; Lemures, 1; Carnivora, 16; Ungulata, 3; Rodentia, 6; Pinnipedia, 1; Hyraces, 1; Passeres, 9; Picariæ, 2; Psittaci, 15; Striges, 1; Accipitres, 7; Columbæ, 1; Galli, 4; Fulicariæ, 1; Impennes, 1; Herodiones, 1; Anseres, 7; Struthiones, 2; Squamata, 1.

Colitis: Primates, 9; Carnivora, 4; Rodentia, 1.

Perforation: Herodiones, 1.

Pancreatitis: Rodentia, 1; Ungulata, 1.

Peritonitis: Primates, 2; Carnivora, 1; Rodentia, 1; Passeres, 1; Striges, 1; Galli, 1; Fulicariæ, 1.

Diseases of the circulatory system:

Pericarditis: Primates, 2; Carnivora, 1; Rodentia, 1; Passeres, 1; Psittaci, 1; Striges, 1; Galli, 1; Struthiones, 1; Accipitres, 1; Anseres, 1; Squamata, 1.

Myocardial disease: Carnivora, 2; Rodentia, 3; Marsupialia, 1; Edentata, 1; Passeres, 2; Picariæ, 1; Accipitres, 1; Anseres, 3; Struthiones, 2; Galli, 1; Impennes, 1.

Arterial disease: Primates, 1; Carnivora, 2; Psittaci, 1; Anseres, 1; Galli, 1.

Diseases of the hepatic system:

Acute (degenerations, inflammations, &c.): Primates, 5; Lemures, 1; Carnivora, 11; Ungulata, 4; Rodentia, 6; Marsupialia, 2; Hyraces, 1; Edentata, 1; Passeres, 11; Picariæ, 1; Psittaci, 9; Galli, 4; Accipitres, 2; Anseres, 4; Herodiones, 1; Struthiones, 1; Striges, 1; Impennes, 1; Squamata, 2; Testudinata, 1.

Chronic (cirrhoses, &c.): Primates, 1; Carnivora, 1; Marsupialia, 1; Passeres, 1; Accipitres, 1; Galli, 1; Striges, 1; Struthiones, 1.

Lithiasis: Lemures, 1.

Diseases of the genito urinary system:

Nephritis:

Acute: Primates, 3; Carnivora, 7; Rodentia, 4; Ungulata, 2; Marsupialia, 2; Edentata, 1; Hyraces, 1; Passeres, 5; Psittaci, 1; Striges, 1; Struthiones, 1.

Chronic: Primates, 1; Lemures, 1; Carnivora, 3; Rodentia, 1; Marsupialia, 2; Galli, 1.

Degenerations: Primates, 3; Carnivora, 8; Ungulata, 2; Rodentia, 2; Pinnipedia, 1; Edentata, 1; Passeres, 1; Psittaci, 5; Anseres, 3; Accipitres, 2; Herodiones, 1; Galli, 2; Struthiones, 1; Striges, 1.

Nephrolithiasis: Carnivora, 1; Marsupialia, 1.

Salpingitis: Striges, 1.

Eggbound: Passeres, 1; Psittaci, 1; Accipitres, 1.

Metritis: Carnivora, 1.

Prolapse of uterus: Rodentia, 1.

Diseases of the respiratory system:

Broncho-pneumonia: Primates, 1; Carnivora, 1; Passeres, 1; Psittaci, 1; Testudinata, 1.

Parasitic-pneumonia: Squamata, 2.

Septic-pneumonia: Primates, 1; Marsupialia, 1; Anseres, 1.

Bronchitis: Primates, 1; Galli, 1.

Congestion of lungs: Carnivora, 3; Marsupialia, 1; Hyraces, 1; Passeres, 6; Psittaci, 3; Striges, 1; Struthiones, 1; Anseres, 1; Herodiones, 1.

Pleuritis: Primates, 2; Ungulata, 1; Marsupialia, 1; Edentata, 1; Passeres, 2.

Diseases of the lymphatic system:

Splenitis: Primates, 5; Carnivora, 7; Rodentia, 2; Marsupialia, 1; Hyraces, 1; Passeres, 6; Psittaci, 7; Striges, 1; Anseres, 1; Struthiones, 2.

Lymphadenitis: Primates, 5; Carnivora, 11; Rodentia, 1; Marsupialia, 1; Pinnipedia, 1.

Leukemia: Psittaci, 2.

Diseases of the skeleton:

Arthritis: Ungulata, 2; Marsupialia, 1; Galli, 1.

Osteomalacia: Primates, 1; Rodentia, 1.

Osteomyelitis: Herodiones, 1.

Osteitis: Ungulata, 1.

Constitutional diseases:

Primary Anemia: Primates, 1.

Secondary Anemia: Primates, 1; Rodentia, 1; Passeres, 1; Psittaci, 3.

Infections:

Tuberculosis: Primates, *2; Rodentia, 1; Ungulata, 1; Passeres, 2; Anseres, 2; Columbæ, 12; Accipitres, 2; Galli, 8; Psittaci, 2.

Mould infection: Passeres, 1; Psittaci, 2; Accipitres, 4; Striges, 1; Herodiones, 1; Impennes, 1.

Tetanus: Ungulata, 1.

Acute general infections (septicemia, &c.): Carnivora, 2; Ungulata, 1; Marsupialia, 1; Passeres, 4; Psittaci, 5; Anseres, 2; Fulicariæ, 1.

Miscellaneous:

Tumors: Primates, 1; Carnivora, 1; Rodentia, 2; Psittaci, 1; Galli, 1; Fulicariæ, 1.

Thyroid disease: Carnivora, 3; Marsupialia, 2; Galli, 1.

Proventricular spiroptera: Psittaci, 1.

Death directly due to parasites: Squamata, 1.

* See notes on tuberculin test.

SECTION II.

TUBERCULIN TEST AND TUBERCULOSIS.

At the time of our last report there were seven monkeys held in the detention room for retesting. During the year thirty-two monkeys have been tested for tuberculosis by the subcutaneous tuberculin injection. Of these twenty were new arrivals. Eighteen animals were passed unconditionally and nine were considered as suspicious enough to segregate yet too good either as specimens or as regards their temperature charts, to hold in the quarantine rooms. They were passed to separate outside cages. There have been twenty deaths among the monkeys this year of which three were monkeys injected during the same period. From the exhibition specimens either in the large house or outside cages no case of tuberculosis was found. Two cases of tuberculosis have been discovered but neither animal was passed to any cage away from the detention rooms. Rhesus Macaque No. 168 was received early in April and injected on the 21st of that month. Having given a poor chart he was held in detention with Rhesus Macaques No. 166 and No. 167. Other monkeys arriving at the same time, Rhesus Macaques Nos. 163, 164 and 165, passed at the first injection. Nos. 163, 164 and 166 still live and appear well. Nos. 165 and 167 are dead but failed to show any tuberculosis. The condition of No. 168 was poor but it did not seem to be tuberculous. Since he was not fit for injection he was held at the laboratory until he died June 21. No animal with which he came in contact has developed tuberculosis. Weeper Cebus No. 64 was received April 24 and on account of his poor physical condition was kept away from the others and remained so until killed. He gave two questionable charts and one bad one, after which he was killed. One small caseous retroperitoneal gland was found, so that he should not have been infective. He was only asso-

ciated with one monkey, Rhesus Macaque No. 156 which is held in quarantine because it harbors an intestinal worm, but it has failed on several occasions to give a tuberculin reaction. Rhesus Macaque No. 156, two Black Handed Spider Monkeys and Weeper Cebus No. 65 are now held in the laboratory for retesting.

The following table represents conditions among the Primates and Lemures. Statistics did not permit extension of the table prior to 1906:

YEAR ENDING.	Number exhibited during year.	Total dying.	Number tuberculous.	Per cent. of deaths tuberculous.	Per cent. of mortality from tuberculosis.
February 28, 1906.		77	60	78
February 28, 1907.		33	18	55
February 28, 1908.		24	3	12.5
February 28, 1909.		26	0	0
February 28, 1910.		25	3	12.5
February 28, 1911.		30	5	16 $\frac{2}{3}$
February 28, 1912.	88	34	12	35	14
February 28, 1913.	94	38	19	50	20
February 28, 1914.	83	23	0	0	0

It would seem from this year's records that the expense and trouble of the general injection of 1912 were justified, because no infection has arisen in the collection.

The two monkeys immunized and presented by Dr. G. B. Webb of Colorado are still in the monkey house, well and growing.

During the year there have been 30 cases of tuberculosis outside the Primates. Among the Ungulates we lost a Mountain Zebra with a lesion, apparently primary, about the head of the cecum extending upward to the mesenteric root glands behind the crura of the diaphragm to the lung, and downward along the brim of the pelvis following the arteries and nerves to the gluteal muscles, the fascias and bursa of the ankle. The mate of this animal was not infected. Among the Rodentia we lost one beaver which was tested by tuber-

culin in 1912. It had general tuberculosis. Among the Galli two wild turkeys have died from tuberculosis, a brush and an eastern wild turkey. These birds were not housed in proximity nor did either one have anything to do with the chicks that died tuberculous in 1912. Among the Accipitres two buzzards were lost. There are also to record two cases among the Anseres, a Summer Duck and a Ross' Goose. The number of cases of tuberculosis for all animals is lower than usual for the Garden. We did not have any tuberculosis among the Carnivora, Marsupialia or Picariæ, among which there are usually some cases. The number of cases among the Columbæ is increased because of the frequency of tuberculomata at the end of the wing.

TUMORS.

Eight new growths have been found among our autopsy material this year. I shall not describe them all as has been the custom, as most of them offer nothing new. There is to be recorded a gastric tumor in a monkey. In my work upon neoplasms I called attention to the fact that among 328 primates no true tumor had been found. To date 381 primates have come to autopsy and one tumor has been observed. I shall cite its anatomy as a matter of record.

2895. Hamadryas Baboon No. 28 (*Papio hamadryas* ♂):

Diffuse adenoma of stomach. Beginning at the pyloric ring and extending toward the cardia for a distance of six centimeters is a lesion of discoidal form which is placed upon the lesser curvature but which in encircling the pyloric ring also extends over to the greater curvature. In this disc the mucosa is thrown up into warty, white elevations which are soft, not ulcerated, congested or hemorrhagic and which are freely movable over the underlying muscularis. The lesion involves the mucosa only. The other

coats are not thickened. No metastases anywhere. The microscopical section shows the muscular coats and submucosa normal. The muscularis mucosa is very robust in places almost equal to the thickness of the submucosa. Its prolongations into the mucosa are also much thicker than normal. The mucosa is greatly thickened equalling the thickness of all the other coats. The tubules in places are regular in direction but in others are bent horizontally and obliquely.

2944. Golden Pheasant (*Chrysolophus pictus* ♀):

Osteoma of rib pressing into lung.

2951. Moor Fowl (*Gallinula chloropus* ♂):

Endothelioma of periosteum of clavical.

2961. Tasmanian Devil (*Sarcophilus ursinus* ♂):

Papillary cyst adenoma of thyroid.

3003. Waltzing Mouse (*Mus wagneri rotans* ♂):

Lymphangio-endothelioma of thigh muscles.

3090. Undulated Grass Parrakeet (*Melopsittacus undulatus* ♂):

Cyst adeno carcinoma papilliferum of kidney.

3113. Black Bear (*Ursinus americanus* ♂):

Epithelioma of root of tongue.

3110. Beechy's Gopher (*Citellus grammurus beecheyi* ♂):

Multiple myeloma. All the bones are irregular in thickness, very brittle and show in their length irregular swellings made up of periosteal growth and probably increase in marrow. The latter is pale yellow with punctate hemorrhages. The skeleton gives no support, but there is little de-

formity. The microscopical section of bone shows a myelomatous growth of costal marrow, new proliferating myelocytes predominating. This is invading the cartilagenous bone with absorption. In some places the cartilage is of fetal type. The perichondrium is active but there is no round cell infiltration. Ossification is imperfect at the costo chondral junctions.

LITHIASIS.

There were two cases of nephrolithiasis this year. They concern a Tasmanian Devil (*Sarcophilus ursinus*) and a Water Mongoose (*Herpestes brachyurus*), the former a marsupial, the latter a carnivore. The concretions in both instances were tiny uratic calculi and sand affecting the kidney pelvis and the apical parts of the pyramid. In both animals a nephritis of some standing existed and in the Tasmanian Devil, a mild pyelitis. Both animals were posted for the taxidermist, so that a close inspection of the joints was not possible, but in neither case was there any chondritis of the ribs or intervertebral discs that could be observed by intrathoracic examination.

A small deeply pigmented hard calculus was found in the tortuous lower end of the gall bladder of a Mongoose Lemur (*Lemur mongoz*). There was no obstruction to the flow of bile by the stone. No jaundice existed. No macroscopic change existed in the gall bladder.

OSTEOMALACIA.

Only two cases were found this year (Western Fox Squirrel, *Sciurius rufiventer* ♂—Silky Marmoset, *Leontocebus rosalia* ♀). They presented no new features. It is encouraging to note that we have had only this one case of this bone condition in primates since our report of 1912. To my recollection no monkey appearing to have the disease has arrived in the last year. The

reason for this improvement is not forthcoming from the laboratory standpoint. The improved hygienic conditions of the monkey house is an undoubted factor.

MYCOTIC ESOPHAGITIS IN MISSISSIPPI KITES (*Ictinia Mississippiensis*).

On July 27th four of these birds were received, apparently in fair condition, although not very fat and somewhat frightened. They remained in good condition until some time early in September when one was found drooping and refused to eat. Two others soon had the same signs and the three died on September 17th, 19th and 25th. The fourth remained in good condition until the first of November. It was kept at the laboratory for some time before it died and while there seemed in good condition. It died suddenly without any unusual signs. All these birds suffered from an infiltrative, caseous and necrotizing condition of the esophageal mucous membrane, apparently beginning high in the tube and stopping at the upper margin of the proventricle in two and at the gizzard in one. The infection must have begun upon the mucous surface because the lesions were superficial and never became generalized. The larger lesions of the gullet were fungoid, soft and friable. The attack upon the wall of the tube consisted of inflammatory lesions with penetrating of mould. From the last case I was able to isolate a *Hyphomyces* or mould belonging to the genus *Oidium* and almost identical with the *Oidium albicans*, the cause of human Thrush. The morphology is practically identical, but the growth upon media differs slightly from this human parasite. The variation may possibly be explained by the high temperature to which it was subjected in the bird's body. The lesions are more extensive and necrotizing than those of thrush, but generalized infections in the human being are known. Infection of fowls with this mould is well known but the lesions are seldom so extensive and necrotic. It seems that we had here a limited but severe thrush epidemic.

OBSERVATIONS BY DR. E. A. SCHUMANN UPON DYSTOCIA
IN WILD ANIMALS.

The specimens upon which these observations were made form the basis of a paper referred to in the opening paragraph of this report.

Labor complicated by the premature detachment of the placenta of a Black Lemur (*Lemur macaco*) No. 81, which was found dead in its cage. Upon autopsy the uterus contained a small fetus with one leg and the tail protruding from the vulva. The fetus was normal in size. There was a large amount of free blood in the uterine cavity and extensive extravasation into the myometrium. The placenta was completely detached.

Dystocia due to Osteomalacia of the Pelvis. A Barbary Ape (*Macacus inuus*) No. 1958, which had been in the collection for two years and was apparently in good health, was discovered in labor. No progress being made and the animal becoming shocked, Dr. Fox made an ineffectual attempt to deliver by version, the monkey dying during the operation. Upon autopsy the uterus contained a fetus apparently at term. The head was extended so that the face presented, but the head was not engaged. The cervix was fully dilated but the uterine muscle was relaxed and flaccid. (The fetus was dead when the animal was first examined.) The uterus contained two placentas as is normal for these apes, the left placenta being the place of attachment of the fetus while the right one was somewhat smaller and presented no umbilical cord. The fetus was normal in size and form, the face was extended and its lower portion far advanced in a caput succedaneum. The measurements of the fetal head were as follows: bi-temporal 5.5 cm, bi-parietal 6 cm, occipito-mental 8.5 cm, occipito-frontal 7.5 cm. The pelvis (dried specimen) presents a most interesting condition. The sacrum is bent sharply forward, carrying with it the border of the ilia, which are bent upon themselves forward and downward. The lateral walls of the pelvis are greatly narrowed, the ischia drawn in-

ward. The pubes and symphysis are fairly normal. The pelvic measurements are: diagonal conjugate 6 cm, true conjugate 4 cm, greatest transverse 4 cm. It is apparent at a glance that here was an impossible labor, since the head of the fetus could not possibly enter the pelvis the size of which intra vitam must have been less than the above measurements by reason of the soft parts. This is, in the experience of the writer, an unique case of complete obstetric history, plus the specimens, of labor with an osteomalacic pelvis in a wild animal.

Labor complicated by rupture of the vagina in a Camel (*Camelus bactrianus* No. 2551) which died of shock in labor at the Zoological Garden. Upon autopsy the animal was found to have hydatid disease of the liver, lungs and spleen, cirrhosis of the liver and nephrolithiasis. Protuding from the vulva was a portion of the fetal membranes, the whole vaginal wall and several coils of intestine which had escaped through a large rent in the posterior vaginal wall. The anterior wall was swollen and edematous, the whole region surrounded by clotted blood. The cervix was obliterated, the membranes unruptured, the fetus in the normal extended head presentation. The veil-like placenta was somewhat injected but otherwise normal. There was some hemorrhage about the rectum but none in the free peritoneum. This animal had broken her hind leg just above the fetlock three weeks before falling into labor, and was unable to stand. It is evident that the difficulty of delivery associated with an unnatural and forced posture due to the fractured leg was sufficient cause for the rupture of the vagina where the tissues were degenerated as a result of the coincident general disease.

Labor complicated by inversion of the uterus and vagina. A Japanese Waltzing Mouse (*Mus wagnerii rotans*) No. 3024, died a few hours after an uneventful labor. On autopsy the entire uterus was found inverted and prolapsed, the organ the seat of a violent congestion, the animal having died of shock.

DR. WEIDMAN'S REPORT.

Of the 293 animals examined this year, 37 have harbored verminous parasites. The infested animals have revealed 47 cases of verminous infestation; *i. e.*, one animal has sheltered two or three different parasites. Of these I have identified the following:

2872. American Badger. *Physaloptera turgida* in stomach.

2873. American Badger. *Physaloptera turgida* in stomach.

2888. Aoudad. *Cysticercus tenuicollis*.

2903. Blue-fronted Amazon. *Spiroptera incerta* in proventricle.

3033. Mountain Zebra. *Ascaris megalocephala* in intestine. Cæstrus larvæ in intestine.

3029. Indian python. *Ascaris rubicunda* in stomach. *Bothridium pythonis* in intestine.

3096. Burchells Zebra. *Ascaris megalocephala* in intestine. Cæstrus larvæ in stomach.

3112. Cape Hunting Dog. *Ascaris mystax* in intestine.

3133. American Badger. *Physaloptera turgida* in stomach.

Sarcoptes minor (*var. cati*) from skin of living wild cat (*Felis ruffus*).

These may not be gathered into any significant groups save for the badgers, whose stomachs commonly contained *Physaloptera turgida*. These have been noted in a previous report in both badgers and opossums. Measures will be taken to treat the old and newly arrived badgers (which are now in detention) and to prevent reinfestation from the old enclosures.

One of the most impressive infestations ever seen in these gardens was noted in the Indian Python (*Python molorus* No. 3029) which died October 1st, 1913. Its intestines contained about two hundred tapeworms (*Bothridium pythonis*, Blainville) averaging 75 cm in length, together with about four hundred blood red,

round worms (*Ascaris rubicunda*, Schneider) averaging 10 cm in length. In addition, the lungs of the reptile contained many blood red nematodes superficially resembling (but not) the intestinal round worms. I could find no mention in standard works of the latter worm. It is probably a new species. Dr. Fox considers this the only case he has seen this year in which the death seemed directly traceable to worms.

SPIROPTERA INCERTA.

During the past year fifty parrots have been received (new arrivals) at the laboratory and subjected to the routine test for *Spiroptera incerta*. In no case were ova of the parasite found. This repeats our experience of last year—in fact we have never been able to condemn a newly-arrived parrot. From this it would seem that the disease was introduced at one fell swoop—perhaps by a single infested bird—rather than intermittently.

In last year's report five birds were listed as sole survivors of the twenty condemned and isolated during the general eliminative process of the year previous. Of these one (Blue-fronted Amazon No. 116) has died this year and presented great numbers of worms at autopsy. The other four have, now, survived for more than two years since being first detected. Our records show that all four were very lightly infested. The surprising fact in connection with these birds is that ova can no longer be found in their droppings, using the same technique as used originally in their detection. This circumstance would confirm our opinion expressed previously "that only a part of the cases listed as verminous died as the result of spiropteriasis; that the cases showing a few worms and not much tissue destruction died from intercurrent disease," etc.*

The worms have probably died out, passed through their span of life, just as we know that the human hookworm may die out in seven years, and that the host

* Fortieth Annual Report of this Society, page 44.

may spontaneously recover unless reinfested. The stake seems too great, however, to pass them back to the parrot house for exhibition.

There have been no deaths from *spiroptera* at the parrot house this year. Out of 190 birds exhibited 34 have died, a percentage of 17.9†. The percentage of mortality for 1911 was 23.7, for 1912, 36.3 and for 1913, 17.2. In this there is a consistent improvement since the overhauling in 1912.

* * * * *

The Mexican Gray Wolf No. 3, which was mentioned in last year's report as having been isolated on account of infestation with tapeworms, has been cured and returned to exhibition. It will be remembered that his isolation was a prophylactic measure against infestation of the nearby ungulates.

* * * * *

Rhesus Macaque No. 156 has also been returned to exhibition after having been detained and treated for whip-worms.

* * * * *

We have never been able to find protozoa (*Balan-tidium coli*) in the feces of our Galapagos Tortoises. These organisms are reported, in another garden, to have been transmitted to monkeys and to have caused colitis.

Respectfully submitted,

HERBERT FOX, M. D.,

Pathologist.

† The figures given in last year's report are erroneously based upon the census. They should have been calculated upon the number of birds exhibited.

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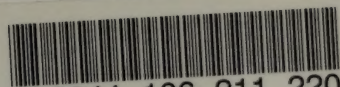
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